ITW

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Takahiro KUSHIDA et al.	Art Unit: 1793
Application No.: 10/588,122	Examiner: Sikyin Ip
Filed: August 1, 2006	Attorney Dkt. No.: 12143-0005

For: STEEL PRODUCT FOR USE AS LINE PIPE HAVING HIGH HIC RESISTANCE AND LINE PIPE PRODUCED USING SUCH STEEL PRODUCT

REQUEST FOR RECONSIDERATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants request reconsideration of the rejection of all claims under 35 U.S.C. § 103(a) based on United States Patent No. 4,105,474 to Nakasugi et al. (Nakasugi).

In review, the Examiner has alleged that the composition of Nakasugi overlaps that which is claimed and the limitation regarding TiN inclusion is met so that a *prima facie* case of obviousness is established.

Applicants traverse the rejection using two points to demonstrate that a *prima facie* case of obviousness has not been established via the reliance on Nakasugi.

Claim 1, among other alloying elements requires 0.0003-0.02% Ca. Also the size of the TiN inclusions is limited to 30 microns or "at most 30 μm."

Turning to Nakasugi, the Examiner cites the Abstract and col. 2, lines 62-68, to support the contention that the limitation regarding TiN is met. The Abstract states the following:

... steel ingot or slab containing not less than 0.004% TiN not larger than

0.02 μ is heated....

What Nakasugi is saying is that only a certain percentage of TiN inclusions, i.e., found in the slab are of a certain size, i.e., less than 0.02 μ. Put another way, Nakasugi is specifying that most of the TiN inclusions, i.e., more than 0.004% of them, have a certain maximum size. Put yet another way, Nakasugi only defines a certain amount of the content of all of the TiN inclusions to be not larger than 0.02μ in size; Nakasugi does not specify a limit a size of **each** TiN inclusion contained in the slab.

This interpretation is supported when considering Figure 1 of Nakasugi and its explanation. In col. 3, lines 7-11, the relationship between the heated γ grain size and the content of TiN not larger or less than 0.02μ is shown. "The content of TiN% not larger than 0.02μ" clearly means that there is content of TiN inclusions in the steel that is larger than 0.02μ. Figure 1 identifies the inventive aspect of Nakasugi with the arrow at the top of the graph. What this is saying is that having the content of the TiN percentage be 0.004% or more along with a TiN size of less than 0.02μ is the invention. Again, this implies that there is content of TiN that is greater than 0.02μ.

Given that Nakasugi must be interpreted to teach that there are TiN inclusions of size greater than 0.02μ, the question becomes whether Nakasugi can be said to teach or suggest the limitation in claim 1 that all TiN inclusions are not greater than 30 μ.

Applicants contend that there is no factual basis to conclude that Nakasugi meets this claim limitation. Certainly, there is no express limitation on the size of the TiN content that does not fall within the desired range of Nakasugi. There is also no basis to infer that the claim limitation all inclusions of TiN are not more than 30μ. The Examiner must always have a reason to formulate an obviousness rejection. Even if the Examiner

were to say that the claim limitation is obvious, where is the factual basis for making this allegation? Nakasugi says nothing about an upper limit regarding the content of TiN. Any allegation on the part of the Examiner in this regard is pure speculation and it has no foundation in fact.

The Examiner's attention is also directed to col. 3, lines 47-65. Here, Nakasugi teaches that the size limitation of not more than 0.02μ applies not only to TiN in solid solution, but also precipitates of TiN. This also implies that there are precipitates that do not fall within the content and size requirements of Nakasugi and this is further substantiation that there is no upper limit on the sizes of the TiN conclusion

Figure 4 is another example indicating that certain content of the TiN contained in the slab of Nakasugi does not meet the limitation of not more than 0.02μ.

In light of the above, it is Applicants' position that Nakasugi does not teach the claim limitation regarding TiN and a *prima facie* case of obviousness is not established. If the Examiner should insist that all Nakasugi teaches that all of the TiN inclusions must be less than 0.02μ, the Examiner is called upon to substantiate this conclusion by identifying, by column and line number, the objective factual basis for this interpretation.

It is also important to understand that the control of the TiN size in the context of the invention is critical and this control produces unexpected improvements in terms of hydrogen-induced cracking or HIC. This understanding is important in the event that the Examiner would admit that Nakasugi does not teach the size limitation on all TiN inclusions, but still conclude that it would be obvious to optimize the size of the inclusions since control of the inclusions is recognized in the art for improving the properties of the inclusion-containing material.

In this regard, the Examiner's attention is directed to Figure 1 of the application. The invention is based on the discovery that if the size of TiN inclusions in the claimed steel composition is reduced, HIC resistance is improved. Figure 1 reveals this finding graphically. It can be generally seen in Figure 1 that as the size of the TiN inclusion is reduced (see paragraph [0024] of Applicants' published application for the definition of a TiN inclusion) the crack area ratio (CAR) is rapidly reduced (the slope of the curve is great). However, when the TiN inclusion size is 30 μ or less, the degree of the reduction of the CAR becomes small (the slope of the curve is small). In fact, it can be seen from Figure 1 that the inflection point occurs around 30 μ in this regard. Therefore and according to the invention, controlling the size of the inclusions to 30μ or less results in improvements that are unforeseen.

Based on the above, the invention produces an unexpected improvement when the TiN inclusions are controlled to be not more than 30μ. This result is nowhere suggested in Nakasugi since Nakasugi is not concerned with the effect of controlling the size of all of the TiN inclusions in the steel, only a certain content amount, i.e., 0.004% or more.

Based on the above, the Examiner has either failed to establish a *prima facie* case of obviousness based on the failure of Nakasugi to teach the TiN limitation, or any such case is rebutted by the comparative evidence of the specification.

A second reason why the rejection should be withdrawn is the presence of calcium in the claims. The inventors have also discovered that calcium is a critical aspect of the invention so that the size of the TiN inclusions can be limited to the claimed "not more than 30 μm." More specifically, titanium, aluminum, and calcium are formed into Al-Ca-Ti-based composite inclusions. A part of each TiN inclusion in the steel product is

included in Al-Ca-Ti-based composite inclusion so that the size of each TiN can become small. Therefore, calcium is an essential element in the present invention.

In Nakasugi, calcium is used with rare earth metals as optional elements to further improve toughness, see col. 7. lines 31-53. The option to use calcium is clear when viewing the various compositions exemplified in Nakasugi; only two bear calcium, see Table 2, Steel Nos. 2 and 3. It is also important to note that Nakasugi says nothing about the effect of calcium on the size of the TiN inclusions. The failure of Nakasugi to recognize the criticality of calcium is another reason why Nakasugi cannot be said to teach the invention of claim 1, and particularly the composition as claimed.

To recap, it is respectfully submitted that the rejection fails for one of two reasons. First, the limitation regarding TiN is not present in Nakasugi nor is there any reason to modify Nakasugi so as to arrive as such a limitation. Second, the control of the TiN inclusions to the size set forth in claim in conjunction with the presence of calcium produced unexpected improvements and these improvements rebut any contention that calcium would be required in Nakasugi and the size of TiN in Nakasugi could be optimized to arrive at the claimed invention. Therefore, the rejection should be withdrawn.

Accordingly, the Examiner is requested to examine this application in light of this Request for Reconsideration and pass all claims onto issuance.

If the Examiner believes that an interview would be helpful in expediting the allowance of this application, the Examiner is requested to telephone the undersigned at 202-835-1753.

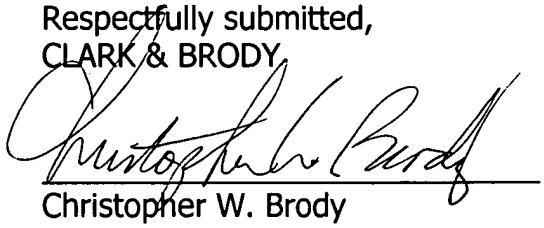
Again, reconsideration and allowance of this application is respectfully requested.

The above constitutes a complete response to all issues raised in the Office Action

dated July 9, 2008.

Applicants submit that no fees are due in connection with this filing, but Deposit Account No. 50-1088 should be charged if any fee deficiency is noted.

Respectfully submitted,
CLARK & BRODY



Christopher W. Brody
Registration No. 33,613

Customer No. 22902
1090 Vermont Avenue, N.W., Suite 250
Washington D.C. 20005
Telephone: 202-835-1111
Facsimile: 202-835-1755

Date: October 8, 2008